

What is claimed is:

1 1. A method for coating an implant comprising the
2 steps of

3 (a) contacting the implant with an aqueous
4 solution of magnesium, calcium, and phosphate ions;

5 (b) passing a gaseous weak acid through the
6 aqueous solution;

7 (c) degassing the aqueous solution; and

8 (d) allowing the magnesium, calcium, and
9 phosphate ions to precipitate onto the implant to form a
10 coating.

1 2. The method of claim 1 wherein the gaseous weak
2 acid is carbon dioxide.

1 3. The method of claim 1 wherein the implant is
2 formed from one or more of metal, organic material, polymer
3 or ceramic.

1 4. The method according to claim 1 wherein the
2 calcium and phosphate ions are present in the aqueous
3 solution in a molar ratio of between about 1 to about 3.

1 5. The method according to claim 1 wherein the
2 calcium and phosphate ions are present in the aqueous
3 solution in a molar ratio of between about 1.5 to about
4 2.5.

1 6. The method according to claim 1 wherein the
2 aqueous solution comprises about 0.5 to about 50 mM calcium
3 ions and about 0.5 to about 20 mM phosphate ions.

4 7. The method according to claim 1 wherein the
5 aqueous solution comprises about 2.5 to about 25 mM calcium
6 ions and about 1.0 to about 10 mM phosphate ions.

1 8. The method according to claim 1 wherein the
2 aqueous solution comprises about 0.1 to about 20 mM
3 magnesium ions.

1 9. The method according to claim 1 wherein the
2 aqueous solution comprises about 1.5 to about 10 mM
3 magnesium ions.

1 10. The method according to claim 1 wherein the
2 aqueous solution comprises no carbonate ions or less than
3 about 50 mM carbonate ions.

1 11. The method according to claim 1 wherein the
2 aqueous solution comprises no carbonate ions or less than
3 about 42 mM carbonate ions.

1 12. The method according to claim 1 wherein the
2 aqueous solution comprises an ionic strength in the range
3 of about 0.1 to about 2 M.

1 13. The method according to claim 1 wherein the
2 aqueous solution comprises an ionic strength in the range
3 of about 0.15 to about 1.5 M.

1 14. The method according to claim 1 wherein the
2 gaseous weak acid is passed through the aqueous solution at
3 a pressure of about 0.1 to about 10 bar.

1 15. The method according to claim 1 wherein the
2 gaseous weak acid is passed through the aqueous solution at
3 a pressure of about 0.5 to about 1.5 bar.

1 16. The method according to claim 1 wherein the
2 aqueous solution has a temperature in the range of between
3 about 5°C to about 80°C.

1 17. The method according to claim 1 wherein the
2 aqueous solution has a temperature in the range of between
3 about 5°C to about 50°C.

1 18. The method according to claim 1 wherein the
2 implant is treated by a mechanical or chemical surface
3 treatment prior to contacting the implant with the aqueous
4 solution.

1 19. The method of claim 18 wherein the implant is
2 treated by sand-blasting, scoring, polishing or grounding.

1 20. The method of claim 18 wherein the implant is
2 treated by contacting with strong mineral acid or an
3 oxidizing agent in a manner to etch the implant.

1 21. The method of claim 1 wherein the coating
2 comprises magnesium ions, calcium ions and phosphate ions
3 and one or more ions selected from the group consisting of
4 hydroxide, carbonate, chloride, sodium and potassium.

1 22. The method of claim 1 wherein the coating
2 comprises one or more of amorphous carbonate calcium
3 phosphate, hydroxyapatite, calcium deficient and hydroxyl
4 carbonate apatite, octacalcium phosphate, dicalcium
5 phosphate dihydrate or calcium carbonate.

1 23. The method of claim 1 wherein the coating has a
2 thickness of about 0.5 to about 100 microns.

1 24. The method of claim 1 wherein the coating has a
2 thickness of about 0.5 to about 50 microns.

1 25. The method of claim 1 further comprising the step
2 of contacting a coated implant with a calcifying solution
3 comprising calcium and phosphate ions, and allowing a
4 precipitate layer of calcium and phosphate ions to form on
5 the coated implant.

1 26. A device for coating an implant comprising
2 (a) reactor vessel;
3 (b) heating element operatively connected to the
4 reactor vessel;
5 (c) implant support;
6 (d) stirrer disposed within the reactor vessel;
7 (f) inlet and outlet operatively connected to
8 the reactor vessel; and
9 (g) controlled source of carbon dioxide
10 operatively connected to the inlet.